

CLAIMS

1. A flat-type display comprising;
 a first panel and a second panel which are
5 bonded to each other in their circumferential portions
 and having a space between the first panel and the
 second panel, the space being in a vacuum state, in
 which
 a spacer is disposed between a first panel
10 effective field and a second panel effective field that
 work as a display portion, and,
 said spacer is fixed to the first panel
 effective field and/or the second panel effective field
 with a low-melting-point metal material layer.
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2. The flat-type display according to claim 1, in
 which the spacer is formed of ceramics or glass.
3. The flat-type display according to claim 1, in
20 which the first panel and the second panel are bonded to
 each other in their circumferential portions through a
 bonding layer made of frit glass.
4. The flat-type display according to claim 1, in
25 which the first panel and the second panel are bonded to
 each other in their circumferential portions through a
 bonding layer made of a low-melting-point metal material.
5. The flat-type display according to claim 1, in
30 which
 the flat-type display is a cold cathode field
 emission display,
 the first panel is an anode panel in which an
 anode electrode and a phosphor layer are formed, and,
35 the second panel is a cathode panel in which a
 plurality of cold cathode field emission devices are
 formed.

6. The flat-type display according to claim 1, in which

5 a plurality of spacer holders for temporarily holding the spacer are formed in the first panel effective field and/or the second panel effective field.

7. The flat-type display according to claim 6, in which the spacer is formed of ceramics or glass.

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8. The flat-type display according to claim 6, in which the first panel and the second panel are bonded to each other in their circumferential portions through a bonding layer made of frit glass.

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9. The flat-type display according to claim 6, in which the first panel and the second panel are bonded to each other in their circumferential portions through a bonding layer made of a low-melting-point metal material.

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10. The flat-type display according to claim 6, in which

the flat-type display is a cold cathode field emission display,

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the first panel is an anode panel in which an anode electrode and a phosphor layer are formed, and,

the second panel is a cathode panel in which a plurality of cold cathode field emission devices are formed.

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11. A method for manufacturing a flat-type display, said flat-type display comprising a first panel and a second panel which are bonded to each other in their circumferential portions and having a space between the first panel and the second panel, the space being in a vacuum state, a spacer being disposed between a first panel effective field and a second panel effective field

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that work as a display portion,
said method comprising;

(A) arranging a spacer with a low-melting-point
metal material layer formed on one top surface thereof,
5 on the first panel effective field, then,

(B) heating the low-melting-point metal
material layer to melt the same and thereby fixing said
spacer to the first panel effective field, and then,

(C) placing the second panel on the other top
10 surface of the spacer, bonding the first panel and the
second panel to each other in their circumferential
portions, and vacuuming the space sandwiched between the
first panel and the second panel.

15 12. The method for manufacturing a flat-type
display according to claim 11, in which the spacer is
formed of ceramics or glass.

13. The method for manufacturing a flat-type
20 display according to claim 11, in which the first panel
and the second panel are bonded to each other in their
circumferential portions through a bonding layer made of
frit glass.

25 14. The method for manufacturing a flat-type
display according to claim 11, in which the first panel
and the second panel are bonded to each other in their
circumferential portions through a bonding layer made of
a low-melting-point metal material.

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15. The method for manufacturing a flat-type
display according to claim 11, in which
the flat-type display is a cold cathode field
emission display,

35 the first panel is an anode panel in which an
anode electrode and a phosphor layer are formed, and,
the second panel is a cathode panel in which a

plurality of cold cathode field emission devices are formed.

16. The method for manufacturing a flat-type
5 display according to claim 11, in which
 the flat-type display is a cold cathode field
 emission display,
 the first panel is a cathode panel in which a
 plurality of cold cathode field emission devices are
10 formed, and,
 the second panel is an anode panel in which an
 anode electrode and a phosphor layer are formed.
17. The method for manufacturing a flat-type
15 display according to claim 11, in which
 a second low-melting-point metal material layer
 is formed on the other top surface of said spacer, and,
 the second low-melting-point metal material
 layer is melted together when the first panel and the
20 second panel are bonded to each other in their
 circumferential portions in said step (C), and said
 spacer is thereby fixed to the second panel effective
 field.
18. The method for manufacturing a flat-type
25 display according to claim 17, in which the spacer is
 formed of ceramics or glass.
19. The method for manufacturing a flat-type
30 display according to claim 17, in which the first panel
 and the second panel are bonded to each other in their
 circumferential portions through a bonding layer made of
 frit glass.
20. The method for manufacturing a flat-type
35 display according to claim 17, in which the first panel
 and the second panel are bonded to each other in their

circumferential portions through a bonding layer made of a low-melting-point metal material.

21. The method for manufacturing a flat-type
5 display according to claim 17, in which
 the flat-type display is a cold cathode field
emission display,
 the first panel is an anode panel in which an
anode electrode and a phosphor layer are formed, and,
10 the second panel is a cathode panel in which a
plurality of cold cathode field emission devices are
formed.
22. The method for manufacturing a flat-type
15 display according to claim 17, in which
 the flat-type display is a cold cathode field
emission display,
 the first panel is a cathode panel in which a
plurality of cold cathode field emission devices are
20 formed, and,
 the second panel is an anode panel in which an
anode electrode and a phosphor layer are formed.
23. The method for manufacturing a flat-type
25 display according to claim 11, in which a plurality of
spacer holders for temporarily holding the spacer are
formed in the first panel effective field and/or the
second panel effective field.
- 30 24. The method for manufacturing a flat-type
display according to claim 23, in which the spacer is
formed of ceramics or glass.
25. The method for manufacturing a flat-type
35 display according to claim 23, in which the first panel
and the second panel are bonded to each other in their
circumferential portions through a bonding layer made of

frit glass.

26. The method for manufacturing a flat-type display according to claim 23, in which the first panel
5 and the second panel are bonded to each other in their circumferential portions through a bonding layer made of a low-melting-point metal material.

27. The method for manufacturing a flat-type
10 display according to claim 23, in which
 the flat-type display is a cold cathode field emission display,
 the first panel is an anode panel in which an anode electrode and a phosphor layer are formed, and,
15 the second panel is a cathode panel in which a plurality of cold cathode field emission devices are formed.

28. The method for manufacturing a flat-type
20 display according to claim 23, in which
 the flat-type display is a cold cathode field emission display,
 the first panel is a cathode panel in which a plurality of cold cathode field emission devices are
25 formed, and,
 the second panel is an anode panel in which an anode electrode and a phosphor layer are formed.

29. A method for manufacturing a flat-type display,
30 said flat-type display comprising a first panel and a second panel which are bonded to each other in their circumferential portions and having a space between the first panel and the second panel, the space being in a vacuum state, a spacer being disposed between a first
35 panel effective field and a second panel effective field that work as a display portion,
 said method comprising;

(A) providing the first panel in which a low-melting-point metal material layer is formed in a portion where the spacer is to be fixed in the first panel effective field,

5 (B) arranging the spacer on said low-melting-point metal material layer, heating the low-melting-point metal material layer to melt the same, and thereby fixing said spacer to the first panel effective field, and then,

10 (C) placing the second panel on the other top surface of the spacer, bonding the first panel and the second panel in their circumferential portions and vacuuming the space sandwiched between the first panel and the second panel.

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30. The method for manufacturing a flat-type display according to claim 29, in which the spacer is formed of ceramics or glass.

20 31. The method for manufacturing a flat-type display according to claim 29, in which the first panel and the second panel are bonded to each other in their circumferential portions through a bonding layer made of frit glass.

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32. The method for manufacturing a flat-type display according to claim 29, in which the first panel and the second panel are bonded to each other in their circumferential portions through a bonding layer made of
30 a low-melting-point metal material.

33. The method for manufacturing a flat-type display according to claim 29, in which
the flat-type display is a cold cathode field
35 emission display,

the first panel is an anode panel in which an anode electrode and a phosphor layer are formed, and,

the second panel is a cathode panel in which a plurality of cold cathode field emission devices are formed.

- 5 34. The method for manufacturing a flat-type display according to claim 29, in which
the flat-type display is a cold cathode field emission display,
the first panel is a cathode panel in which a
10 plurality of cold cathode field emission devices are formed, and,
the second panel is an anode panel in which an anode electrode and a phosphor layer are formed.
- 15 35. The method for manufacturing a flat-type display according to claim 29, in which
a second low-melting-point metal material layer is formed on a portion where the spacer is to be fixed in the second panel effective field, and,
20 the second low-melting-point metal material layer is melted when the first panel and the second panel are bonded in their circumferential portions in said step (C), and thereby the spacer is fixed to the second panel effective field.
- 25 36. The method for manufacturing a flat-type display according to claim 35, in which the spacer is formed of ceramics or glass.
- 30 37. The method for manufacturing a flat-type display according to claim 35, in which the first panel and the second panel are bonded to each other in their circumferential portions through a bonding layer made of frit glass.
- 35 38. The method for manufacturing a flat-type display according to claim 35, in which the first panel

and the second panel are bonded to each other in their circumferential portions through a bonding layer made of a low-melting-point metal material.

- 5 39. The method for manufacturing a flat-type display according to claim 35, in which
the flat-type display is a cold cathode field emission display,
the first panel is an anode panel in which an
10 anode electrode and a phosphor layer are formed, and,
the second panel is a cathode panel in which a plurality of cold cathode field emission devices are formed.
- 15 40. The method for manufacturing a flat-type display according to claim 35, in which
the flat-type display is a cold cathode field emission display,
the first panel is a cathode panel in which a
20 plurality of cold cathode field emission devices are formed, and,
the second panel is an anode panel in which an anode electrode and a phosphor layer are formed.
- 25 41. The method for manufacturing a flat-type display according to claim 29, in which
a plurality of the spacer holders for temporarily holding the spacer are formed in the first
panel effective field and/or the second panel effective
30 field.
42. The method for manufacturing a flat-type display according to claim 41, in which the spacer is formed of ceramics or glass.
- 35 43. The method for manufacturing a flat-type display according to claim 41, in which the first panel

and the second panel are bonded to each other in their circumferential portions through a bonding layer made of frit glass.

5 44. The method for manufacturing a flat-type display according to claim 41, in which the first panel and the second panel are bonded to each other in their circumferential portions through a bonding layer made of a low-melting-point metal material.

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45. The method for manufacturing a flat-type display according to claim 41, in which
 the flat-type display is a cold cathode field emission display,

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 the first panel is an anode panel in which an anode electrode and a phosphor layer are formed, and,
 the second panel is a cathode panel in which a plurality of cold cathode field emission devices are formed.

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46. The method for manufacturing a flat-type display according to claim 41, in which
 the flat-type display is a cold cathode field emission display,

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 the first panel is a cathode panel in which a plurality of cold cathode field emission devices are formed, and,

 the second panel is an anode panel in which an anode electrode and a phosphor layer are formed.

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